Simple Examples that FAIL

Last updated 5/28/26

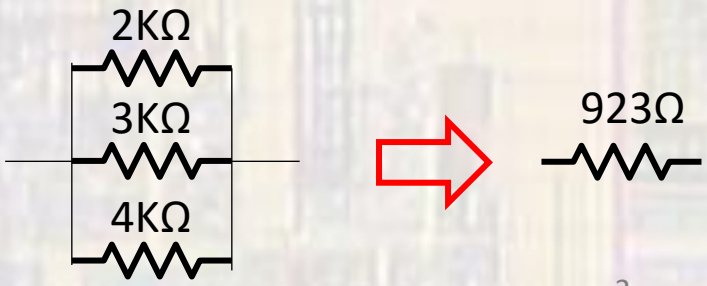
Resistor Calculations

- Combinations of resistors
  - Series Resistors
    - Values add together
    - $R_{series} = R1 + R2 + R3$

  - Parallel Resistors
    - Reciprocals of values add together
    - $1/R_{parallel} = 1/R1 + 1/R2 + 1/R3$

Shortcut for 2 resistors

$R_{parallel} = (R_1 * R_2) / (R_1 + R_2)$



Integer Fails

- Calculate the parallel resistance of 2 resistors
  - Code Snippit

```
31
32          ////////////////////////////////////////////////////////
33          // parallel solution 1
34          r_parallel = (r1 * r2) / (r1 + r2);
35
36          // parallel solution 2
37  //      r_parallel = 1 / ( (1 / r1) + (1 / r2));
38
39          ////////////////////////////////////////////////////////
40
```

  - Example values – solution 1

```
Class_Notes_Project.exe [C/C++ Application]  [pid: 22]
Please enter your 2 resistor values: 20 20

        The parallel combination of 20 Ohms and 20 Ohms is 10 Ohms

Please enter your 2 resistor values: 10 20

        The parallel combination of 10 Ohms and 20 Ohms is 6 Ohms

Please enter your 2 resistor values: 10000 10000

        The parallel combination of 10000 Ohms and 10000 Ohms is 5000 Ohms

Please enter your 2 resistor values: 50000 50000

        The parallel combination of 50000 Ohms and 50000 Ohms is -17949 Ohms
```




Integer Fails

- Calculate the parallel resistance of 2 resistors
  - Code Snippit

```
32          ////////////////////////////////////////////////////////
33
34  //      // parallel solution 1
35  //      r_parallel = (r1 * r2) / (r1 + r2);
36
37          // parallel solution 2
38          r_parallel = 1 / ( (1 / r1) + (1 / r2));
39
40          ////////////////////////////////////////////////////////
```

  - Example values – solution 2

```
<terminated> (exit value: -1,073,741,676) Class_Notes_Project.exe [C/C++ Ap
Please enter your 2 resistor values: 20 20
```

Program fails (terminates)

Decimal Fails

- Verify that 2 decimal numbers are different by 1
  - Code Snippit

print this message if different by 1

```
30          ////////////////////////////////////////////////////////////
31          // try with 1.0 2.0  and then  1.4, 2.4 to show floating point error
32
33          if(val2 == val1 + 1)
34              printf("\n\tIF path chosen --- val1 equals %f, val2 equals %f: val2 = val1 + 1\n\n", val1, val2);
35          else
36              printf("\n\tELSE path chosen --- val1 equals %f, val2 equals %f: val2 /= val1 + 1\n\n", val1, val2);
37
38          ////////////////////////////////////////////////////////////
```

print this message if not different by 1

  - Example values

```
Class_Notes_Project.exe [C/C++ Application]  [pid: 29]
please enter 2 decimal values with a difference of 1: 1.0 2.0

        IF path chosen --- val1 equals 1.000000, val2 equals 2.000000: val2 = val1 + 1

please enter 2 decimal values with a difference of 1: 1.1 2.1

        ELSE path chosen --- val1 equals 1.100000, val2 equals 2.100000: val2 /= val1 + 1

please enter 2 decimal values with a difference of 1: 1.5 2.5

        IF path chosen --- val1 equals 1.500000, val2 equals 2.500000: val2 = val1 + 1

please enter 2 decimal values with a difference of 1: 1.6 2.6

        ELSE path chosen --- val1 equals 1.600000, val2 equals 2.600000: val2 /= val1 + 1
```




Decimal Fails

- Verify that 2 decimal numbers are different by 1
  - Code Snippit w/ extra precision on print

print this message if different by 1

```
40      ////////////////////////////////////////////////////////
41
42      if(val2 == val1 + 1)
43          printf("\n\tIF path chosen --- val1 equals %.10f, val2 equals %.10f: val2 = val1 + 1\n\n", val1, val2);
44      else
45          printf("\n\tELSE path chosen --- val1 equals %.10f, val2 equals %.10f: val2 /= val1 + 1\n\n", val1, val2);
46
47      ////////////////////////////////////////////////////////
```

print this message if not different by 1

  - Example values

```
Class_Notes_Project.exe [C/C++ Application] [pid: 32]
please enter 2 decimal values with a difference of 1: 1.0 2.0

        IF path chosen --- val1 equals 1.0000000000, val2 equals 2.0000000000: val2 = val1 + 1

please enter 2 decimal values with a difference of 1: 1.1 2.2

        ELSE path chosen --- val1 equals 1.1000000238, val2 equals 2.2000000477: val2 /= val1 + 1

please enter 2 decimal values with a difference of 1: 1.5 2.5

        IF path chosen --- val1 equals 1.5000000000, val2 equals 2.5000000000: val2 = val1 + 1

please enter 2 decimal values with a difference of 1: 1.6 2.6

        ELSE path chosen --- val1 equals 1.6000000238, val2 equals 2.5999999046: val2 /= val1 + 1
```